GEM Detector R&D at UVa

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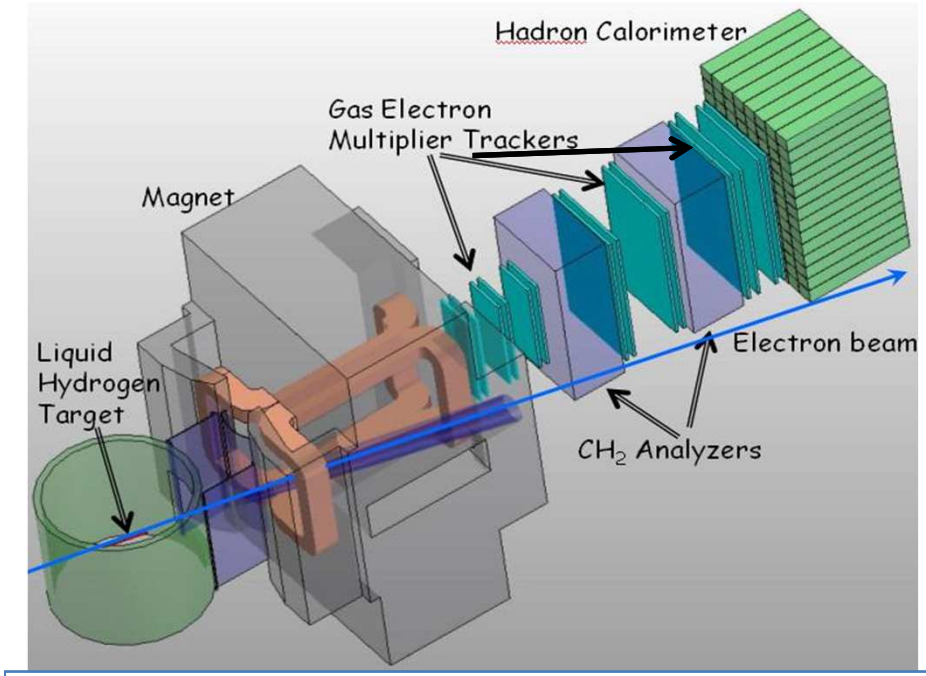
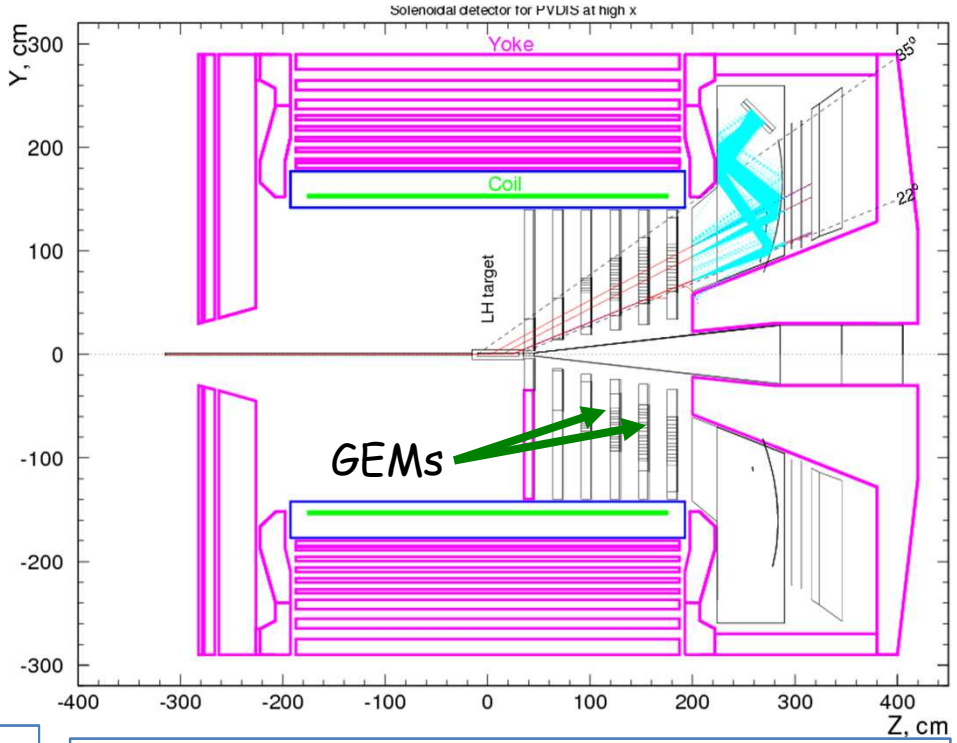
The Uva group is currently conducting large area GEM detector R&D for two proposed spectrometers at Jefferson lab

Super-Bigbite Spectrometer



- Construct 3 large GEM trackers in collaboration with INFN-Rome
- 50 cm x 40 cm GEM modules will be used to assemble chambers up to 200 cm x 40 cm

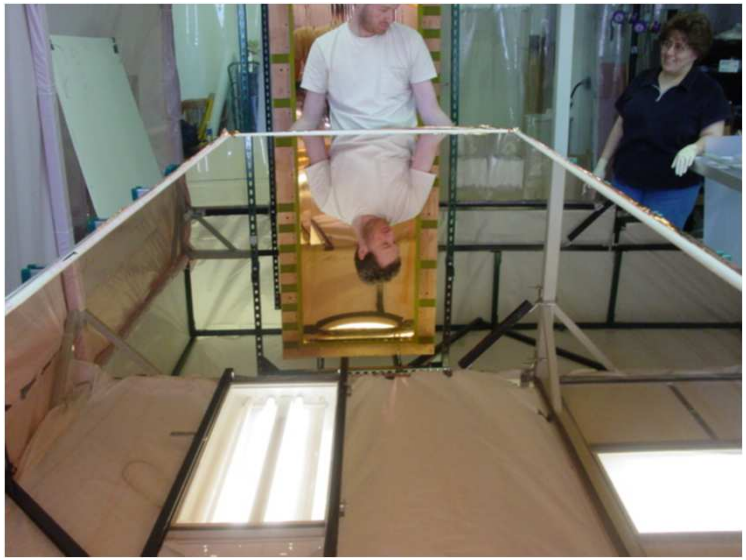
SoLID spectrometer



- Circular GEM disks up to 2.25 m radius.

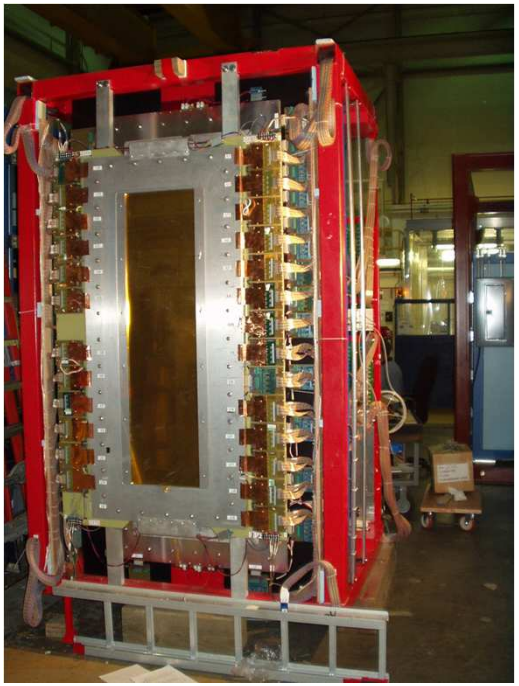
UVa Detector Lab

- A well equipped detector construction lab with a 4 m x 4 m clean-room – another clean room will be added later this year.
- Previously constructed a the Drift chamber based tracker for Bigbite spectrometer: 2 m x 0.5 m MWDCs.
- Prototype GEM tracker with five 10 cm x 10 cm chambers was also built here



Stretching 2 m x 0.5 m cathode planes .

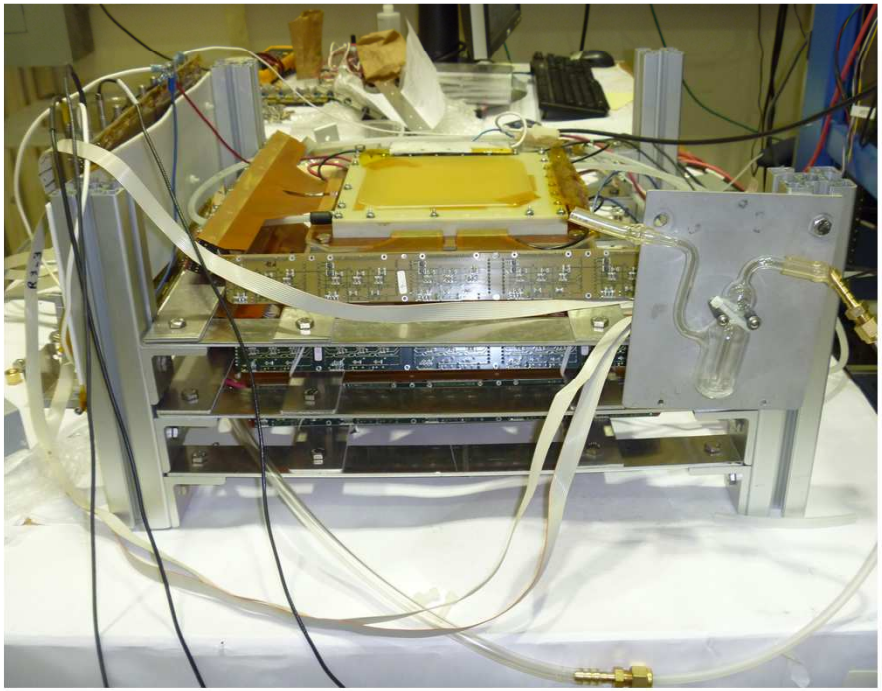
The UVa clean room.



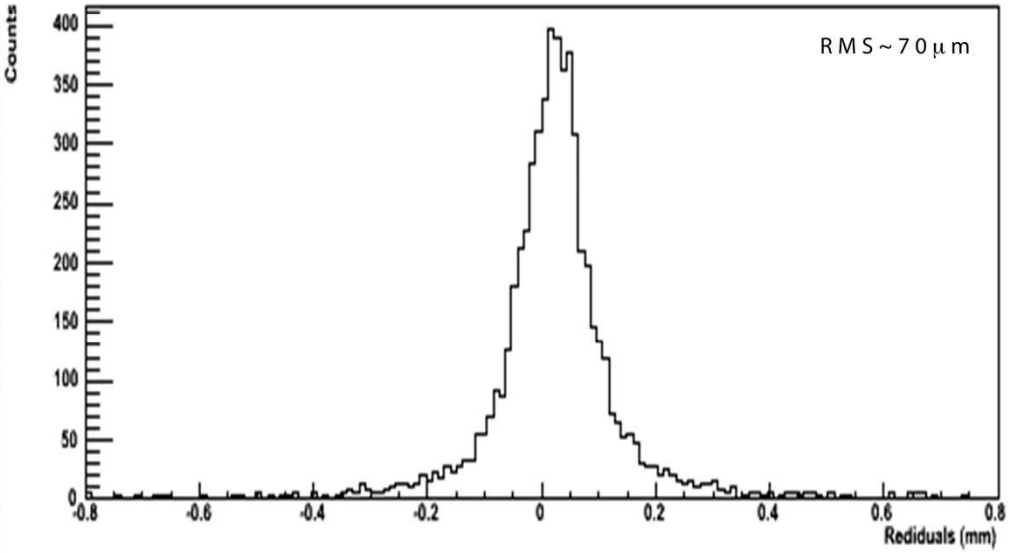
Bigbite MWDC tracker built at UVa.

Uva Prototype GEM tracker

- Prototype GEM tracker with five 10 cm x 10 cm constructed and beam tested in Jefferson Lab hall A last year.
- Currently being prepared for another test run later this year.
- Will be tested with new APV25 based electronics
- Plan to construct and test a 40 cm x 50 cm prototype this summer.



The prototype tracker being prepared for the beam test.



Track position resolution achieved during the beam test run

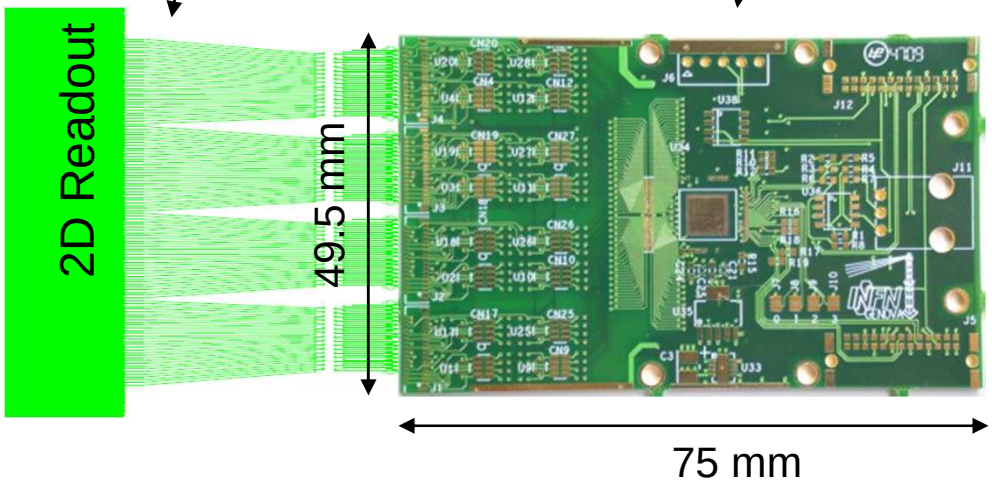
GEM chamber test setup at UVa

- APV25 based readout system with 2800 channels for testing prototype GEM chambers.
- Developed by INFN, manufactured by a commercial company

The GEM readout board

APV25 Front End Card

ADC + APV controller, housed in VME64x



Up to 10m twisted, shielded copper cable

Courtesy of Paolo Musico, INFN

- Iseg-Wiener MPOD High Voltage system with 16 sensitive HV channels to power GEM chamber
- System expandable to 160 channels.